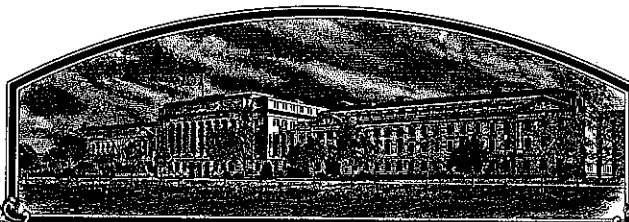


No.

9400200



THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

U.S. Department of Agriculture/Agric. Research Service

N.C. Agricultural Research Service

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED NOVEL VARIETY OF SEXUALLY REPRODUCED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF *eighteen* YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, (THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, OR IMPORTING IT, OR EXPORTING IT, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT. THE UNITED STATES SEED OF THIS VARIETY (1) SHALL BE SOLD BY VARIETY NAME ONLY AS SEED OF CERTIFIED SEED AND (2) SHALL CONFORM TO THE NUMBER OF GENERATIONS REQUIRED BY THE OWNER OF THE RIGHTS. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

(*Waived, except that this waiver shall not apply to breeder seed, foundation seed, labeling requirements, and blending limitations)

SOYBEAN

'Pearl'

In Testimony Whereof, I have hereunto set my hand and caused the seal of the Plant Variety Protection Office to be affixed at the City of Washington, D.C. this 30th day of November in the year of our Lord one thousand nine hundred and ninety-five.

Attest:

Martha A. Stanton
Commissioner

Plant Variety Protection Office
Agricultural Marketing Service

Van Fleetman
Secretary of Agriculture

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE
(Instructions on reverse)

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME OF APPLICANT(S) (as it is to appear on the Certificate) a) U.S. Dept. of Agriculture/Agri. Research Service b) N.C. Agricultural Research Service		2. TEMPORARY DESIGNATION OR EXPERIMENTAL NO. Experimental	3. VARIETY NAME "Pearl"
4. ADDRESS (street and no. or R.F.D. no., city, state, and ZIP) Box 7643 N.C. State University Raleigh, NC 27695-7643		5. PHONE (include area code) 919-515-2718	FOR OFFICIAL USE ONLY PVPO NUMBER 9400200
6. GENUS AND SPECIES NAME Glycine max	7. FAMILY NAME (Botanical) Leguminosae	FILING Date June 13, 1994 Time <input type="checkbox"/> A.M. <input checked="" type="checkbox"/> P.M.	
8. CROP KIND NAME (Common Name) Soybean	9. DATE OF DETERMINATION	FILING Filing and Examination Fee: \$2,325.00 Date 6/13/94	
10. IF THE APPLICANT NAMED IS NOT A "PERSON," GIVE FORM OF ORGANIZATION (Corporation, partnership, association, etc.)		R E C E I V E D Certificate Fee: \$275.00 Date Sept. 5, 1995	
11. IF INCORPORATED, GIVE STATE OF INCORPORATION	12. DATE OF INCORPORATION		
13. NAME AND ADDRESS OF APPLICANT REPRESENTATIVE(S), IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS Michael W. Baker NC Foundation Seed Producers 8220 Riley Hill Road Zebulon, NC 27597			

PHONE (include area code):

14. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED (Follow INSTRUCTIONS on reverse)

a. ☒ Exhibit A, Origin and Breeding History of the Variety

b. ☒ Exhibit B, Novelty Statement.

c. ☒ Exhibit C, Objective Description of Variety.

d. ☒ Exhibit D, Additional Description of Variety.

e. ☒ Exhibit E, Statement of the Basis of Applicant's Ownership.

f. ☒ Seed Sample (2,500 viable untreated seeds). Date Seed Sample mailed to Plant Variety Protection Office _____

g. ☒ Filing and Examination Fee. (2,325) - made payable to "Treasurer of the United States."

15. DOES THE APPLICANT(S) SPECIFY THAT SEED OF THIS VARIETY BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED? (See section 83(a) of the Plant Variety Protection Act.)
☒ YES (If "YES," answer items 16 and 17 below) ☐ NO (If "NO," skip to item 18 below)

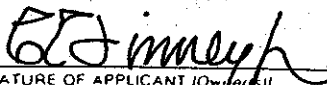
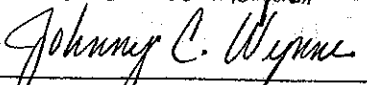
16. DOES THE APPLICANT(S) SPECIFY THAT THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS?
☒ YES ☐ NO

17. IF "YES" TO ITEM 16, WHICH CLASSES OF PRODUCTION BEYOND BREEDER SEED?
☒ FOUNDATION ☐ REGISTERED ☒ CERTIFIED

18. DID THE APPLICANT(S) PREVIOUSLY FILE FOR PROTECTION OF THE VARIETY IN THE U.S.?
☐ YES (If "YES," through ☐ Plant Variety Protection Act ☐ Patent Act Give date: _____)
☒ NO

19. HAS THE VARIETY BEEN RELEASED, USED, OFFERED FOR SALE, OR MARKETING IN THE U.S. OR OTHER COUNTRIES?
☐ YES (If "YES," give names of countries and dates)
☒ NO

20. The applicant(s) declare(s) that a viable sample of basic seeds of this variety will be furnished with the application and will be replenished upon request in accordance with such regulations as may be applicable.
The undersigned applicant(s) is (are) the owner(s) of this sexually reproduced novel plant variety, and believe(s) that the variety is distinct, uniform, and stable as required in section 41, and is entitled to protection under the provisions of section 42 of the Plant Variety Protection Act.
Applicant(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.

SIGNATURE OF APPLICANT (Owner(s)) 	CAPACITY OR TITLE Administrator USDA/ARS	DATE APR 08 1994
SIGNATURE OF APPLICANT (Owner(s)) 	CAPACITY OR TITLE Director NC Agric. Research Service	DATE 3/28/94

- 14a. 1. 'Pearl' (NTCPR90-172) was developed by the USDA-ARS cooperating with NCARS. The line is an F4 selection from the cross of G80-1515 Vance. G80-1515 is derived from the cross 'Pickett 71' x 'Bedford'.
2. The initial and subsequent selection was conducted in North Carolina. The final selection was made in 1989. Yield evaluations were made in the following year in a preliminary trial at Plymouth, NC. The line was tested in 1991 at two NC locations as part of the breeding program and at 5 locations by the NCSU Variety Testing Program. The line was also tested in at Plymouth, NC. Breeder seed was provided to the NC Foundation Seed Program in 1991 and has been increased for two years.
3. Round-leafed plants were occasionally found at low frequency due to mixture. These were rogued prior to harvest.
4. Testing and increase from 1990-1993 has demonstrated no instability.
- 14b. Pearl (NTCPR90-172) is most similar to Vance. It differs from Vance in maturity (12 days later) and has slightly smaller seed size.
- 14c. See attached form
- 14d. none

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
LIVESTOCK, MEAT, GRAIN & SEED DIVISION
PLANT VARIETY PROTECTION OFFICE
BELTSVILLE, MARYLAND 20705

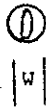
EXHIBIT C
(Soybean)

OBJECTIVE DESCRIPTION OF VARIETY
SOYBEAN (*Glycine max* L.)

NAME OF APPLICANT(S) a) U.S. Dept. of Agriculture/Agri. Res.Svc. b) N.C. Agricultural Research Service	TEMPORARY DESIGNATION Experimental	VARIETY NAME "Pearl"
ADDRESS (Street and No., or R.F.D. No., City, State, and Zip Code) Box 7643 N.C. State University Raleigh, NC 27695-7643		FOR OFFICIAL USE ONLY PVPO NUMBER 9400200

Choose the appropriate response which characterizes the variety in the features described below. When the number of significant digits in your answer is fewer than the number of boxes provided, place a zero in the first box when number is 9 or less (e.g.,).

1. SEED SHAPE:



1 = Spherical (L/W, L/T, and T/W ratios = < 1.2)
3 = Elongate (L/T ratio > 1.2; T/W = < 1.2)

2 = Spherical Flattened (L/W ratio > 1.2; L/T ratio = < 1.2)
4 = Elongate Flattened (L/T ratio > 1.2; T/W > 1.2)

2. SEED COAT COLOR: (Mature Seed)

1 = Yellow

2 = Green

3 = Brown

4 = Black

5 = Other (Specify) _____

3. SEED COAT LUSTER: (Mature Hand Shelled Seed)

1 = Dull ('Corsoy 79'; 'Braxton')

2 = Shiny ('Nebsoy'; 'Gasoy 17')

4. SEED SIZE: (Mature Seed)

Grams per 100 seeds

5. HILUM COLOR: (Mature Seed)

1 = Buff

2 = Yellow

3 = Brown

4 = Gray

5 = Imperfect Black

6 = Black

7 = Other (Specify) _____

6. COTYLEDON COLOR: (Mature Seed)

1 = Yellow

2 = Green

7. SEED PROTEIN PEROXIDASE ACTIVITY:

1 = Low

2 = High

8. SEED PROTEIN ELECTROPHORETIC BAND:

1 = Type A (SP1^a)2 = Type B (SP1^b)

9. HYPOCOTYL COLOR:

1 = Green only ('Evans'; 'Davis')

2 = Green with bronze band below cotyledons ('Woodworth'; 'Tracy')

3 = Light Purple below cotyledons ('Beeson'; 'Pickett 71')

4 = Dark Purple extending to unifoliate leaves ('Hodgson'; 'Coker Hampton 266A')

10. LEAFLET SHAPE:

1 = Lanceolate

2 = Oval

3 = Ovate

4 = Other (Specify) _____

11. LEAFLET SIZE:

☐ 21 = Small ('Amsoy 71'; 'A5312')
3 = Large ('Crawford'; 'Tracy')

2 = Medium ('Corsoy 79'; 'Gasoy 17')

12. LEAF COLOR:

☐1 = Light Green ('Weber'; 'York')
3 = Dark Green ('Gnome'; 'Tracy')

2 = Medium Green ('Corsoy 79'; 'Braxton')

13. FLOWER COLOR:

☐ 1

1 = White

2 = Purple

3 = White with purple throat

14. POD COLOR:

☐ 1

1 = Tan

2 = Brown

3 = Black

15. PLANT PUBESCENCE COLOR:

☐ 1

1 = Gray

2 = Brown (Tawny)

16. PLANT TYPES:

☐ 11 = Slender ('Essex'; 'Amsoy 71')
3 = Bushy ('Gnome'; 'Govan')

2 = Intermediate ('Amcor'; 'Braxton')

17. PLANT HABIT:

☐ 1

1 = Determinate ('Gnome'; 'Braxton')

2 = Semi-Determinate ('Will')

3 = Indeterminate ('Nebsoy'; 'Improved Pelican')

18. MATURITY GROUP:

☐ 0 ☐ 9

1 = 000

2 = 00

3 = 0

4 = I

5 = II

6 = III

7 = IV

8 = V

9 = VI

10 = VII

11 = VIII

12 = IX

13 = X

19. DISEASE REACTION: (Enter 0 = Not Tested; 1 = Susceptible; 2 = Resistant)

BACTERIAL DISEASES:

☐ 0Bacterial Pustule (*Xanthomonas phaseoli* var. *sojensis*)☐ 0Bacterial Blight (*Pseudomonas glycinea*)☐ 0Wildfire (*Pseudomonas tabaci*)

FUNGAL DISEASES:

☐ 0Brown Spot (*Septoria glycines*)Frogeye Leaf Spot (*Cercospora sojina*)☐ 0

Race 1

☐ 0

Race 2

☐ 0

Race 3

☐ 0

Race 4

☐ 0

Race 5

☐

Other (Specify)

☐ 0Target Spot (*Corynespora cassicola*)☐ 0Downy Mildew (*Peronospora trifoliorum* var. *manshurica*)☐ 0Powdery Mildew (*Microspheera diffusa*)☐ 0Brown Stem Rot (*Cephalosporium gregatum*)☐ 0Stem Canker (*Diaporthe phaseolorum* var. *caulivora*)

4

19. DISEASE REACTION: (Enter 0 = Not Tested; 1 = Susceptible; 2 = Resistant) (Continued)

FUNGAL DISEASES: (Continued)

☐ Pod and Stem Blight (*Diaporthe phaseolorum* var. *sojae*)
☐ Purple Seed Stain (*Cercospora kikuchii*)
☐ Rhizoctonia Root Rot (*Rhizoctonia solani*)
 Phytophthora Rot (*Phytophthora megasperma* var. *sojae*)
☐ Race 1 ☐ Race 2 ☐ Race 3 ☐ Race 4 ☐ Race 5 ☐ Race 6 ☐ Race 7
☐ Race 8 ☐ Race 9 ☐ Other (Specify) _____

VIRAL DISEASES:

☐ Bud Blight (Tobacco Ringspot Virus)
☐ Yellow Mosaic (Bean Yellow Mosaic Virus)
☐ Cowpea Mosaic (Cowpea Chlorotic Virus)
☐ Pod Mottle (Bean Pod Mottle Virus)
☐ Seed Mottle (Soybean Mosaic Virus)

NEMATODE DISEASES:

Soybean Cyst Nematode (*Heterodera glycines*)
☐ Race 1 ☐ Race 2 ☐ Race 3 ☐ Race 4 ☐ Other (Specify) _____
☐ Lance Nematode (*Hoplolaimus Colombus*)
☐ Southern Root Knot Nematode (*Meloidogyne incognita*)
☐ Northern Root Knot Nematode (*Meloidogyne Hapla*)
☐ Peanut Root Knot Nematode (*Meloidogyne arenaria*)
☐ Reniform Nematode (*Rotylenchulus reniformis*)
☐ OTHER DISEASE NOT ON FORM (Specify): _____

20. PHYSIOLOGICAL RESPONSES: (Enter 0 = Not Tested; 1 = Susceptible; 2 = Resistant)

☐ Iron Chlorosis on Calcareous Soil
☐ Other (Specify) _____

21. INSECT REACTION: (Enter 0 = Not Tested; 1 = Susceptible; 2 = Resistant)

☐ Mexican Bean Beetle (*Epilachna varivestis*)
☐ Potato Leaf Hopper (*Empoasca fabae*)
☐ Other (Specify) _____

22. INDICATE WHICH VARIETY MOST CLOSELY RESEMBLES THAT SUBMITTED.

CHARACTER	NAME OF VARIETY	CHARACTER	NAME OF VARIETY
Plant Shape	Vance	Seed Coat Luster	Vance
Leaf Shape	Vance	Seed Size	Vance
Leaf Color	Vance	Seed Shape	Vance
Leaf Size	Vance	Seedling Pigmentation	Bedford

23. GIVE DATA FOR SUBMITTED AND SIMILAR STANDARD VARIETY: Paired Comparison Data

VARIETY	NO. OF DAYS MATURITY*	PLANT LODGING SCORE	CM PLANT HEIGHT	LEAFLET SIZE		SEED CONTENT		SEED SIZE G/100 SEEDS	NO. SEEDS/ POD
				CM Width	CM Length	% Protein	% Oil		
Submitted	10/28	2	89	5.3	15.0	41.7	18.6	8.5	2.9
Vance Name of Similar Variety	10/16	2	66	3.9	13.7	43.2	18.7	9.1	2.8

PUBLICATIONS USEFUL AS REFERENCE AIDS FOR COMPLETING THIS FORM:

1. Caldwell, B.E., ed. 1973. Soybeans: Improvement, Production, and Uses. Amer. Soc. Agron. Monograph No. 16.
2. Buttery, B.R. and R.I. Buzzell. 1968. Peroxidase activity in seeds of soybean varieties. Crop Sci., 8: 722-725.
3. Hymowitz, T. 1973. Electrophoretic analysis of SBTI-A₂ in the USDA soybean germplasm collection. Crop Sci., 13: 420-421.
4. Payne, R.C. and L.F. Morris. 1976. Differentiation of soybean cultivars by seedling pigmentation patterns. J. Seed Technol. 1: 1-19.

*Average planting date approximately June 1

6

Table 1. Summary of yield results for the proposed release, NTC90-172 and the check cultivar Young.

	<u>Soybean Breeding Program Trials</u>	<u>NCSU Variety Testing Program</u>	<u>Average</u>
NTC90-172+	3347	2688	2980
Young	3529	2822	3136
LSD _{0.05}	279	403	----
No. of environments	4	5	9

+Tested in 1990, 1991, 1992 in a total of 9 North Carolina environments.

Table 2. Mean yield, seed protein and oil content and seed weight, swell ratio, maturity date (MD), flowering date (FD) and lodging scores of the proposed and two checks averaged across four environments from 1990 to 1992.

TRAITS								
	Seed Yield	Seed Protein Content	Seed Oil Content	Seed Weight	Swell* Ratio	MD†	FD‡	Lodging¥
	kg ha ⁻¹	-----%	-----	g 100 ⁻¹				
NTCPR90-172	3347	41.7	18.6	8.4	2.24	28	12	2.0
Vance	3529	43.2	18.7	9.1	2.17	16	1	2.0
Young	3529	42.7	20.4	16.7	2.21	25	9	3.0
LSD _{0.05}	279	1.4	0.6	0.7				

*Seed weight after 15 hours of imbibition divided by initial dry seed weight.
A high ratio is an indicator of desirable processing characters.

†October 1=1

‡August 1=1

¥1=Erect; 5=Prostrate

SOYBEAN**PEARL****Exhibit E. Statement of the Basis of Applicant's Ownership**

Pearl was developed by Dr. Thomas E. Carter, Jr., Research Geneticist with the U.S. Department of Agriculture, Agricultural Research Service, (USDA-ARS) and Professor of Crop Science with the N.C. Agricultural Research Service (NCARS) College of Agriculture and Life Sciences, N.C. State University. Pearl is owned exclusively by the USDA-ARS and the NCARS who retain all rights to its use.

The United States Department of Agriculture
Agricultural Research Service
Washington, DC 20250

and

The North Carolina Agricultural Research Service
Raleigh, North Carolina 27695

NOTICE OF RELEASE OF PEARL SOYBEAN

The U.S. Department of Agriculture, Agricultural Research Service, and the North Carolina Agricultural Research Service announce the release of a soybean cultivar named Pearl. Pearl is a small-seeded specialty cultivar selected for production of natto, a fermented soyfoods product widely consumed in southern Japan. Pearl matures later than other publicly released cultivars developed for the natto market.

Pearl, previously identified as NTCPR90-172, is an F₄-derived selection from the cross of G80-1515 x Vance. G80-1515 is derived from the cross of Pickett 71 x Bedford. Pearl was developed by Dr. Thomas E. Carter, Jr., Research Geneticist.

Pearl was evaluated in a total of nine environments in North Carolina from 1989 through 1992, five were in the North Carolina Official Variety trials. Averaged over the nine environments, Pearl yielded 95 percent of the cultivar Young and was superior in lodging resistance. Pearl is resistant to the southern root knot nematode, moderately resistant to peanut root knot and Japanese root knot nematodes, and susceptible to the soybean cyst nematode.

In four North Carolina environments, the average 100-seed weight of Pearl was 8.4 grams compared to 16.7 grams for Young, and 9.1 grams for Vance. Pearl averaged 41.7 and 18.6 percent protein and oil, respectively, while Young averaged 42.7 and 20.4 percent and Vance averaged 43.2 and 18.7 percent. Pearl matures approximately 3 days later than Young (October 25-30) and twelve days later than Vance (October 14-18). Pearl has grey pubescence, white flowers and narrow leaves. Hilum color is buff with seed rarely exhibiting a bleeding hilum. It is suggested that Pearl be planted full season rather than double cropped after small grains. Because of its lodging resistance, it is well adapted to narrow row spacing.

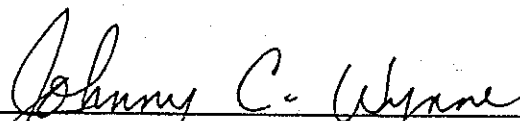
Requests for seed should be sent to Mike Baker, Manager N.C. Foundation Seed Producers, 8220 Riley Hill Road, Zebulon, NC 27597. The U.S. Department of Agriculture has no seed for distribution.

Notice of Release of Pearl Soybean

Page 2

MAR 18 1994

Administrator, U.S. Department of Agriculture
Agricultural Research Service, Washington, DC

Date3/8/94

Director, North Carolina Agricultural
Research Service, Raleigh, NC

Date



United States
Department of
Agriculture

Agricultural
Marketing
Service

Science
Division

Plant Variety Protection Office
NAL Building, Room 500
10301 Baltimore Blvd.
Beltsville, MD 20705-2351

Sir/Madam:

SUBJECT: PV Application No. 9400200, SOYBEAN, 'Pearl'

As provided in section 83(a) of the Plant Variety Protection Act, 7 U.S.C. 2321, we request that the Certificate on the above variety be issued with a notation on the Certificate that the right to exclude others from selling, offering for sale, reproducing, importing or exporting the variety covered by this Certificate, or using it in producing a hybrid or different variety is **waived**, except that this waiver shall not apply to breeders seed, foundation seed, labeling requirements, and blending limitations.

It has been agreed that the Certificate should be issued in the name(s) of:

U.S. Dept. of Agriculture / NC Agricultural Research Service

Michael N. Borden
Signature

8/26/95
Date



The Agricultural Marketing Service
is an agency of the
United States Department of Agriculture